Ontario

Apprenticeship
In-school Curriculum Standards

Railway Car Technician

Level 2 Intermediate

268R

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Introduction

This curriculum revision for the Level 2 – Railway Car Technician is based upon the on-the-job performance objectives, located in the industry approved training standard.

The curriculum is organized into 8 reportable subjects. The Program Summary of Reportable Subjects chart summarizes the training hours for each reportable subject.

The curriculum identifies only the learning that takes place off-the-job. The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the Apprenticeship Training Standards. Employers/Sponsors are expected to extend the apprentice's knowledge and skills through practical training on the work site. Regular evaluations of the apprentice's knowledge and skills are conducted throughout training to ensure that all apprentices have achieved the learning outcomes and content identified in the curriculum standard.

It is not the intent of the in-school curriculum to perfect on-the-job skills. The practical portion of the in-school program is used to reinforce theoretical knowledge. Skill training is provided on the job.

Program Summary of Reportable Subjects – Level 2

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical
S0454	Car/Train Safety and Maintenance Inspections 1	15	9	6
S0455	Rail Car Trucks 1	33	18	15
S0456	Rail Car Underframes 1	33	24	9
S0457	Rail Car Bodies 1	45	30	15
S0458	Welding and Fabrication 2	33	9	24
S0459	Regulatory Publications 2	9	9	0
S0460	Rail Car Brakes 2	39	24	15
S0461	Rail Coaches 1	33	24	9
	Total	**240**	**147**	**93**

Number: **S0454**

Title: **CAR/TRAIN SAFETY AND MAINTENANCE INSPECTIONS 1**

Duration: Total 15 hours Theory 9 hours Practical 6 hours

Prerequisites: L1 - S0446, S0447, S0448, S0449, S0450, S0451, S0452, S0453

Content:

S0454.1 Describe car/train in-bound or out-bound rolling pull-by inspection procedures **(4.5 hrs)**

S0454.2 Describe standing car/train inspection procedures **(3.5 hrs)**

S0454.3 Describe procedures for inspecting dangerous goods being carried by cars/trains **(3.5 hrs)**

S0454.4 Describe open-top car/train load inspection procedures **(3.5 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
60 %	40%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0454.0 Car/Train Safety and Maintenance Inspections 1

Duration: Total 15 hours Theory 9 hours Practical 6 hours

Cross Reference to Training Standards: 5578.01, 5578.02, 5578.03, 5578.05

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to describe procedures for performing in-bound or out-bound rolling stock pull-by and standing car/train inspections; describe dangerous commodity inspection procedures; and, describe open-top load inspection procedures.

LEARNING OUTCOMES AND CONTENT

54.1 Describe car/train in-bound or out-bound rolling pull-by inspection procedures. **(4.5 hrs)**

Describe in-bound or out-bound rolling pull-by inspection procedures:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- defects/damaged components
- damage components
- troubleshooting
  - abnormal sounds
  - rubber smells
  - strong chemical smells
  - dragging brakes
- repair procedures
- hand brakes are released
- replacement procedures
- checking and inspection devices
- hand tools and equipment
- verification process
- site clean-up procedures
- recommendations for further actions
- work documentation

54.2 Describe standing car/train inspection procedures. **(3.5 hrs)**

Describe standing car/train inspection procedures:

- safety legislation
- AAR regulations
- blue flag procedures
- job documentation
- inspection procedures
- protective clothing
- protective equipment and gear
- troubleshooting
  - shifted or improper loads
  - strong chemical smells
  - overheating wheels
  - seized bearings
  - defective components
  - leaks
  - qualification dates
- defects/damage
- tools and equipment
- checking and inspection devices
- hand tools
- power equipment
- repair procedures
- replacement procedures
- adjustment procedures
- site clean-up procedures
- verification process
- recommendations for further actions
- work documentation

54.3 Describe procedures for inspecting dangerous commodities being carried by cars/trains. **(3.5 hrs)**

Describe procedures for inspecting dangerous goods:

- safety legislation
- AAR regulations
- blue flag procedures
- job documentation
- protective clothing
- protective equipment and gear
- placards
  - type
  - quantity
  - placement
- inspection procedures
  - safety valves
  - qualification dates
  - leaks
- troubleshooting
- inspection procedures
- defects/damage
- tools and equipment
- checking and inspection devices
- gauges
- hand tools
- power equipment
- repair procedures
- replacement procedures
- site clean-up procedures
- verification process
- recommendations for further actions
- work documentation

54.4 Describe open-top car/train load inspection procedures. **(3.5 hrs)**

Describe open-top load inspection procedures:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- blue flag procedures
- inspection procedures
  - securements
  - blocking
  - banding
  - cables
  - location of load on car
  - load distribution
  - load dimensions
- troubleshooting
- defects/damage
- hand tools
- power equipment
- gauges
- repair procedures
- replacement procedures
- verification process
- recommendations for further actions
- work documentation
- site clean-up procedures

Number: **S0455**

Title: **RAIL CAR TRUCKS 1**

Duration: Total 33 hours Theory 18 hours Practical 15 hours

Prerequisites: L1 - S0446, S0447, S0448, S0449, S0450, S0451, S0452, S0453

Content:

S0455.1 Describe procedures for the maintenance of rail car wheels **(7 hrs)**

S0455.2 Describe procedures for maintaining rail car roller bearings **(7 hrs)**

S0455.3 Describe procedures for maintaining rail car bolsters **(7 hrs)**

S0455.4 Describe procedures for maintaining rail car truck suspension systems **(6 hrs)**

S0455.5 Describe procedures for maintaining rail car side frames **(6 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
55 %	45%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0455.0 **Rail Car Trucks 1**

Duration: Total 33 hours Theory 18 hours Practical 15 hours

Cross Reference to Training Standards: 5574.01, 5574.02, 5574.03, 5574.04, 5574.05

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to describe procedures for maintaining rail truck wheels, roller bearings, bolsters, truck suspensions, and side frames.

LEARNING OUTCOMES AND CONTENT

55.1 Describe procedures for the maintenance of rail car wheels. **(7 hrs)**

Describe wheel inspection and maintenance procedures:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- types and components of wheels
  - wheels
  - axles
  - roller bearings
- gauges
  - simplified wheel gauges
  - steel wheel gauges
  - combination gauges
  - tread-worn hollow gauges
  - back-to-back gauges
- inspection procedures
- wheel defects/damage
- condemnable defects
- repair procedures
- replacement procedures
- hand tools and power equipment
- checking and inspection devices
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation

55.2 Describe procedures for maintaining rail car roller bearings. **(7 hrs)**

Describe inspection and maintenance procedures for roller bearings:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- types and components of roller bearings
  - bearings
  - end caps
  - backing rings
  - cups
  - seals
- inspection procedures
- defective/damaged parts
  - loose
  - cracked
  - broken
  - missing
  - overheated
- field and shop inspection procedures
- repair procedures
- hand tools and power equipment
- checking and inspection devices
  - temperature indicating crayons
  - temperature measuring devices
- verification process
- replacement procedures
- recommendations for further actions
- site clean-up procedures
- work documentation

55.3 Describe procedures for maintaining rail car bolsters. **(7 hrs)**

Describe inspection and maintenance procedures for bolsters:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- types and components of bolsters
  - gibs
  - wear plates
  - bolster pockets
  - centre plate rings
  - centre pins
  - side bearings
  - cages
  - sizes
- inspection procedures
  - magnetic particle
  - visual
  - manual
- bolster defects/damage
- repair procedures
- rebuilding procedures
- replacement procedures
- hand tools and power equipment
- checking and inspection devices
  - gauges
  - calipers
  - steel rules
- verification process
- site clean-up procedures
- recommendations for further actions
- work documentation

55.4 Describe procedures for maintaining rail car truck suspension systems. **(6 hrs)**

Describe inspection and maintenance procedures for truck suspension systems:

- safety legislation
- AAR regulations
- job documentation
- suspension dampening systems
  - coil springs
  - friction blocks
  - truck side bearings
  - elliptical springs
  - shock absorbers
  - air spring bellows
  - load levelers
  - load snubbers
  - spring planks
  - hangers
  - torsion bars
  - safeties
- inspection procedures
- defects/damage
- repair procedures
- replacement procedures
- rebuilding procedures
- adjustment procedures
- hand tools and power equipment
- checking and inspection devices
- recommendations for further actions
- verification process
- site clean-up procedures
- work documentation

55.5 Describe procedures for maintaining rail car side frames. **(6 hrs)**

Describe side frames inspection and maintenance procedures:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- checking and inspection devices
  - gauges
  - calipers
  - steel rules
- side frames
  - side frames
  - column wear plates
  - column widths
  - thrust lug spacing and centering
  - pedestal roofs
  - paring buttons
- inspection procedures
- defects/damage
  - cracking indicators
  - deformations
- repair procedures
- replacement procedures
- rebuilding procedures
- hand tools and power equipment
- checking and inspection devices
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation

Railway Car Technician – Level 2

Number: **S0456**

Title: **RAIL CAR UNDERFRAMES 1**

Duration: Total 33 hours Theory 24 hours Practical 9 hours

Prerequisites: L1 - S0446, S0447, S0448, S0449, S0450, S0451, S0452, S0453

Content:

S0456.1 Describe maintenance procedures for rail car coupling devices. **(11 hrs)**

S0456.2 Describe maintenance procedures for rail car articulated connectors **(11 hrs)**

S0456.3 Describe maintenance procedures for the end and centre of rail car draft systems **(11 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
70%	30%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0456.0 Rail Car Underframes 1

Duration: Total 33 hours Theory 24 hours Practical 9 hours

Cross Reference to Training Standards: 5575.01, 5575.02, 5575.03

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to describe underframe maintenance procedures for rail car coupling devices, articulated connectors, and the end and centre of draft systems.

LEARNING OUTCOMES AND CONTENT

56.1 Describe maintenance procedures for rail car coupling devices. **(11 hrs)**

Describe maintenance procedures for coupling devices:

- safety legislation and AAR regulations
- job documentation
- components of coupling devices
  - throwers
  - locking blocks
  - lifters
  - coupler bodies
  - knuckles
  - knuckle pins
  - top uncoupling levers
  - bottom uncoupling levers
  - cross-key retainer
  - coupler carrier wear plates
  - shank wear plates
- inspection procedures
- defects/damage
- maintenance procedures
  - welding
  - grinding
  - heating
  - straightening

56.1 Continued

- replacement procedures
- hand tools and power equipment
- checking and inspection devices
- verification process
- site clean-up procedures
- work documentation

56.2 Describe maintenance procedures for rail car articulated connectors. **(11 hrs)**

Describe maintenance procedures for articulated connectors:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- components of articulated connectors
  - connecting pins
  - locking wedges
  - spherical balls
  - spherical ball liners
  - shackle connectors
  - male and female inter-connecting castings
  - retaining bolts
  - retaining pins
  - cross-keys
  - carrier wear plates
  - shank wear plates
- inspection procedures
- defects/damage
- repairing and rebuilding procedures
  - welding
  - grinding
  - heating
  - press fitting with hydraulic devices
- replacement procedures
- hand tools and power equipment
- checking and inspection devices
- recommendations for further actions
- verification process
- site clean-up procedures
- work documentation

56.3 Describe maintenance procedures for the end and centre of rail car draft systems. **(11 hrs)**

Describe maintenance procedures for the end and centre of car draft systems:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- components of car draft systems
  - centre of car cushioning devices
  - sliding centre sills
  - yokes
  - draft gears
  - followers
  - follower blocks
  - carriers
  - gas units
  - draft stops
- inspection procedures
- defects/damage
- repairing or rebuilding procedures
  - welding
  - grinding
  - heating
  - straightening
- replacement procedures
- recharging or replacing gas units
- hand tools and power equipment
  - welding machine
  - cutting torch
  - table lift
  - hydraulic ram
  - plasma arc
- checking and inspection devices
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation

Number: **S0457**

Title: **RAIL CAR BODIES 1**

Duration: Total 45 hours Theory 30 hours Practical 15 hours

Prerequisites: L1 - S0446, S0447, S0448, S0449, S0450, S0451, S0452, S0453

Content:

S0457.1 Describe maintenance procedures for box car bodies **(15 hrs)**

S0457.2 Describe maintenance procedures for flat car bodies **(15 hrs)**

S0457.3 Describe maintenance procedures for gondola car bodies **(15 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
65%	35%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0457.0 **Rail Car Bodies 1**

Duration: Total 45 hours Theory 30 hours Practical 15 hours

Cross Reference to Training Standards: 5579.02, 5579.03

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice is able to describe procedures for maintaining and servicing box car bodies, flat car bodies, and gondola car bodies.

LEARNING OUTCOMES AND CONTENT

57.1 Describe procedures for maintaining box car bodies. **(15 hrs)**

Describe maintenance procedures for box car bodies:

- safety legislation
- AAR regulations
- job documentation
- protective clothing, equipment and gear
- car ends, sides, roofs, and doors
- inspection procedures
- defects/damage
  - holes
  - cracks
  - rust
  - leaks
  - body damage
  - bent and/or twisted doors
  - lack of lubrication
- maintenance procedures
  - welding
  - grinding
  - heating
  - adjusting

57.1 Continued

- replacement procedures
- hand tools and power equipment
- welding equipment
- hoisting or rigging equipment
- checking and inspection devices
- verification process
- site clean-up procedures
- recommendations for further actions
- work documentation

57.2 Describe procedures for maintaining flat car bodies. **(15 hrs)**

Describe servicing and maintenance procedures for flat car bodies:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- types of flat cars
  - multi-level
  - bulkhead
  - piggy flat-back
- components of flat cars
  - car ends and end doors
  - wheel chocks
  - chains
  - ratchets
  - car sides and side sheeting
  - roofs
  - hitches
  - rub bars
  - aprons
  - flooring and decking
- inspection procedures
- defects/damage
  - holes
  - cracks
  - rust
  - leaks
  - body damage

57.2 Continued

- maintenance procedures
  - welding
  - cutting
  - straightening
  - riveting
  - grinding
  - fastening
- replacement procedures
- hand tools and power equipment
- welding equipment
- checking and inspection devices
- hoisting or rigging equipment
- verification process
- recommendation for further actions
- site clean-up procedures
- work documentation

57.3 Describe procedures for maintaining gondola car bodies. **(15 hrs)**

Describe maintenance procedures for gondola car bodies:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- components of gondola cars
  - car ends
  - sides
  - roofs
  - doors
  - end gate
  - locks
  - interior flooring
  - interior sheeting
  - vertical stiffeners
  - bulkhead and load dividers
- inspection procedures
- defects/damage
  - holes
  - cracks
  - rust
  - leaks
  - body damage

57.3 Continued

- maintenance procedures
  - welding
  - cutting
  - straightening
  - riveting
  - grinding
  - fastening
- replacement procedures
- hand tools and power equipment
- checking and inspection devices
- welding equipment
- hoisting or rigging equipment
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation

Number: **S0458**

Title: **WELDING AND FABRICATION 2**

Duration: Total 33 hours Theory 9 hours Practical 24 hours

Prerequisites: L1 - S0451

Content:

S0458.1 Demonstrate (SMAW) shielded metal arc welding procedures **(29 hrs)**

S0458.2 Demonstrate procedures for operating emergency safety equipment when performing welding processes **(2 hrs)**

S0458.3 Demonstrate procedures for handling hazardous material and dangerous goods/commodities when performing welding processes **(2 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
30%	70%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0458.0 Welding and Fabrication 2

Duration: Total 33 hours Theory 9 hours Practical 24 hours

Cross Reference to Training Standards: 5570.02, 5570.06, 5570.13, 5571.11, 5571.12, 5571.13, 5571.14

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice will be able to demonstrate (SMAW) Shielded Metal Arc Welding processes.

LEARNING OUTCOMES AND CONTENT

58.1 Demonstrate shielded metal arc welding (SMAW) procedures. **(29 hrs)**

Demonstrate shielded metal arc welding (SMAW) procedures:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- engineering drawings
- job documentation
- power source
- welding cable assemblies
- electrode holders
- electrode type and size
- assess equipment condition
- assembly of welding equipment
- attachments and tooling
- setting up of welding equipment
- testing of welding equipment
- checking and inspection devices
- calibration procedures
- verification process
- site clean-up procedures
- welding documentation

58.2 Demonstrate procedures for operating emergency safety equipment when performing welding processes. **(2 hrs)**

Describe procedures for operating welding emergency safety equipment:

- type of emergency safety equipment
- safety legislation
- AAR regulations
- protective equipment and gear
- fire suppression equipment
- fire extinguishers
- respirators
- first aid equipment
- operational procedures
- work documentation

58.3 Demonstrate procedures for handling hazardous material and dangerous goods/commodities when performing welding processes. **(2 hrs)**

Describe procedures for handling hazardous material and dangerous goods/commodities during welding processes:

- safety legislation
- AAR regulations
- protective clothing
- protective equipment and gear
- job documentation
- handling procedures
- storage procedures
- work documentation

Railway Car Technician – Level 2

Number: **S0459**

Title: **REGULATORY PUBLICATIONS 2**

Duration: Total 9 hours Theory 9 hours Practical 0 hours

Prerequisites: L1 - S0451

Content:

S0459.1 Interpret regulations and procedures from the Association of American Railroads Mechanical Section, Manual Sections D, G, H, C, E, B **(4 hrs)**

S0459.2 Interpret the regulations from the Association of American Railroads (AAR) Field Manual related to Air Brake Equipment, Roller Bearings, Wheels, Axles, and Trucks **(5 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
100%	0%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications, Transportation Technology Center, Association of American Railroads
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0459.0 **Regulatory Publications 2**

Duration: Total 9 hours Theory 9 hours Practical 0 hours

Cross Reference to Training Standards: U5570.0 > U5580.0 (All)

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice will be able to interpret specifications, standards, and practices in the Association of American Railroads Manual, Mechanical Section, Sections D, G, H, C, E, B and the regulations from the Association of American Railroads (AAR) Field Manual related to Air Brake Equipment, Roller Bearings, Wheels, Axles, and Trucks.

LEARNING OUTCOMES AND CONTENT

59.1 Interpret specifications, standards, and practices in the Association of American Railroads Mechanical Manual, Section, Sections D, G, H, C, E, B. **(4 hrs)**

Interpret specific regulations from Section D II:
- codes
- designated features
- trucks
- side frames
- truck bolsters
- truck details

Interpret specific regulations from Sections G I & II and H I &II:
- codes
- design features
- wheels
- axles
- roller bearings

Interpret specific regulations from Sections C I, II & III:
- car construction

Interpret specific regulations from Section E:
- brakes

Interpret specific regulations from Section B:
- couplers

59.2 Interpret the regulations from the Association of American Railroads (AAR) Field Manual related to Air Brake Equipment, Roller Bearings, Wheels, Axles, and Trucks. **(5 hrs)**

Interpret specific regulations related to Air Brake Equipment.

Interpret specific regulations related to Roller Bearings.

Interpret specific regulations related to Wheels and Axles.

Interpret specific regulations related to Trucks.

Number: **S0460**

Title: **RAIL CAR BRAKES 2**

Duration: Total 39 hours Theory 24 hours Practical 15 hours

Prerequisites: L1 - S0446, S0447, S0448, S0449, S0450, S0451, S0452, S0453

Content:

S0460.1 Describe procedures for conducting a single-car brake test **(9 hrs)**

S0460.2 Describe procedures for servicing and replacing rail car brake valves **(10 hrs)**

S0460.3 Describe procedures for servicing and maintaining flexible hoses, train-line hoses, and piping **(10 hrs)**

S0460.4 Describe procedures for servicing and maintaining rail car brake cylinder units **(10 hrs)**

Evaluation & Testing: Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
60%	40%	100%

Instructional/Delivery Strategies: Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0460.0 Rail Car Brakes 2

Duration: Total 39 hours Theory 24 hours Practical 15 hours

Cross Reference to Training Standards: 5576.02, 5576.03, 5576.04

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice will be able to describe procedures for conducting a single-car air brake test, and, testing, maintaining, and servicing rail car brake valves, flexible hoes, train-line hoses, piping, and brake cylinder units.

LEARNING OUTCOMES AND CONTENT

60.1 Describe procedures for conducting a single-car brake test. **(9 hrs)**

Describe procedures for conducting a single-car brake test:

- safety legislation
- AAR regulations
- daily testing the single-car test devices
- tagging procedures
- components
  - brake rigging
  - shoes
  - hand brake
  - release rods
- replacing defective parts
- coupling the air brake machine and air supply to freight car
- maintenance procedures
  - welding
  - straightening
  - grinding
  - heating
- adjustments and modifications procedures
- testing
  - valves
  - piping
  - slack adjusters
  - reservoirs
  - cylinders

60.1 Continued

- hand tools and power equipment
- checking and inspection devices
- verification process
- work documentation

60.2 Describe procedures for servicing and replacing rail car brake valves. **(10 hrs)**

Describe replacement procedures for brake valves:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- defective and damaged values
- tagging defective components
- single-car air brake testing procedures
- type of valves
- replacement procedures
- stenciling procedures
- hand tools and power equipment
  - sockets
  - ratchets
  - hammers
  - torches
  - pliers
  - wrenches
- checking and measuring devices
  - single-car test devices
- hoisting and rigging equipment
- recommendations for further overhaul and actions
- verification process
- site clean-up procedures
- work documentation

60.3 Describe procedures for servicing and maintaining flexible hoses, train-line hoses, and piping. **(10 hrs)**

Describe procedures for servicing and maintaining flexible hoses, train-line hoses, and piping:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- single-car air brake testing procedures
- leak testing
- defects/damage
  - deteriorated hoses
  - outdated hoses
  - clearances
  - damaged components
- replacement procedures
- repair procedures
  - welding
  - straightening
  - fastening
  - tightening
- hand tools and power equipment
  - torches
  - wrenches
  - grinders
  - welding equipment
  - bar
  - hammer
  - fasteners
- single-car test devices
- checking and inspection devices
- verification process
- site clean-up procedures
- work documentation

60.4 Describe procedures for servicing and maintaining rail car brake cylinder units. **(10 hrs)**

Describe procedures for maintaining brake cylinder units:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- single-car air brake testing procedures
- defective/damage components
- out-of-adjustment brake cylinder units
- fasteners
- replacement procedures
- recommendation for further actions
- tagging cylinders for overhaul or repair
- hand tools and power equipment
  - wrenches
  - fasteners
  - clamps
- checking and inspection devices
- single-car test devices
- verification process
- site clean-up procedures
- work documentation

Number: **S0461**

Title: **RAIL COACHES 1**

Duration: Total 33 hours Theory 24 hours Practical 9 hours

Prerequisites: L1 - S0446, S0447, S0448, S0449, S0450, S0451, S0452, S0453

Content:

S0461.1 Describe procedures for maintaining the exterior end of a rail coach **(4 hrs)**

S0461.2 Describe procedures for maintaining rail coach vestibules **(4 hrs)**

S0461.3 Describe procedures for maintaining rail coach roofs **(4 hrs)**

S0461.4 Describe procedures for maintaining the exterior sides of a rail coach **(4 hrs)**

S0461.5 Describe procedures for maintaining underframes of a rail coach **(4 hrs)**

S0461.6 Describe procedures for maintaining the sides and ends of a rail coach **(4 hrs)**

S0461.7 Describe procedures for maintaining rail coach ceilings and floors **(3 hrs)**

S0461.8 Describe procedures for maintaining window blinds and curtains on a rail coach **(3 hrs)**

S0461.9 Describe procedures for maintaining the interior furnishing of a rail coach **(3 hrs)**

Evaluation & Testing:
Assignments related to theory and application skills
Final test at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Final Assessment
75%	25%	100%

Instructional/Delivery Strategies:
Lecture
Video
Paper based material
CBT

Reference Materials:

AAR Publications
Safety Legislation
Interpreting Engineering Drawings
Technical Mathematics and Calculations
Metrology (Measuring and Checking)
Welding Technology
Railway Locomotive Inspection & Safety Rules
http://www.tc.gc.ca./railway/rules/tc_o_0_55.htm#contents
Railway Passenger Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-26.htm
Railway Freight Car Inspection and Safety Rules
http://www.tc.gc.ca./railway/rules/tc_0-06-1.htm

S0461.0 **Rail Coaches 1**

Duration: Total 33 hours Theory 24 hours Practical 9 hours

Cross Reference to Training Standards: 5580.01 > 5580.10

GENERAL LEARNING OUTCOMES

Upon successful completion the apprentice will be able to describe procedures for inspecting, servicing and maintaining the interior and exterior of rail coaches.

LEARNING OUTCOMES AND CONTENT

61.1 Describe procedures for maintaining the exterior end of a rail coach. **(4 hrs)**

Describe procedures for maintaining rail coach exterior ends:

- safety legislations
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
  - end sills
  - end posts
  - end sheets
  - corner posts
  - tops sills
  - bellows and diaphragms
  - headers
  - stay rods and brackets
  - side rods
  - guides
  - springs and bellow springs
  - curtains and gates
  - threshold plates
- repair & replacement procedures
- hand tools and power equipment
  - painting equipment
  - welding equipment
  - cutting torch
  - pneumatic or electric tools

61.1 Continued

- checking and inspection devices
- verification process
- work documentation
- hoisting and rigging equipment

61.2 Describe procedures for maintaining rail coach vestibules. **(4 hrs)**

Describe procedures *for maintaining rail coach vestibules:*

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- checking and inspection devices
- coach vestibule components
  - steps
  - doors and hardware
  - window frames and seals
  - trap door hardware and seals
  - platforms
  - ceilings
  - filter frames
  - fixed end doors
- replacement procedures
- repair procedures
  - welding
  - riveting
  - fitting
  - grinding
  - cutting
  - painting
- hand tools and power equipment
  - welding equipment
  - painting equipment
  - cutting torch
  - pneumatic or electric tools
  - ladders and rigging equipment
- ladders and rigging equipment
- checking and inspections devices
- verification process
- site clean-up procedures
- work documentation

61.3 Describe procedures for maintaining rail coach roofs. **(4 hrs)**

Describe procedures for maintaining rail coach roofs:

- safety legislation
- AAR regulation
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- coach roof components
  - roof sheeting
  - caps
  - hatches
  - hatch frames
  - rain gutters
  - shrouds
  - cover
- troubleshooting procedures
- replacement procedures
- repair procedures
  - welding
  - riveting
  - fitting
  - grinding
  - cutting
  - painting
- hand tools and power equipment
  - welding equipment
  - painting equipment
  - cutting torch
  - pneumatic or electric tools
- hoisting and rigging equipment
- checking and inspection devices
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation

61.4 Describe procedures for maintaining the exterior sides of a rail coach. **(4 hrs)**

Describe procedures for maintaining rail coach exterior sides:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- coach side components
  - side posts
  - sheeting
  - sills
  - top sills
  - window frames
  - skirts
  - name plates
  - vent covers
- troubleshooting procedures
- replacement procedures
- repair procedures
  - welding
  - riveting
  - fitting
  - grinding
  - cutting
  - painting
- hand tools and power equipment
  - welding equipment
  - painting equipment
  - cutting torch
  - pneumatic or electric tools
- hoisting and rigging equipment
- checking and inspection devices
- verification process
- recommendation for further actions
- site clean-up procedures
- work documentation

61.5 Describe procedures for maintaining underframes of a rail coach. **(4 hrs)**

Describe procedures for maintaining rail coach underframes:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- coach underframe components
  - draft systems
  - trucks
  - wheels
  - securements
  - air conditioning units
  - raceways
  - waste tanks
  - battery boxes
  - water tanks
  - battery chargers
  - floor deafening and insulation
- troubleshooting procedures
- replacement procedures
- repair procedures
  - welding
  - riveting
  - fitting
  - grinding
  - cutting
  - painting
- hand tools and power equipment
  - welding equipment
  - painting equipment
  - cutting torch
  - pneumatic or electric tools
- hoisting and rigging equipment
- checking and inspection devices
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation

61.6 Describe procedures for maintaining the sides and ends of a rail coach. **(4 hrs)**

Describe procedures for maintaining rail coach interior sides and ends:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- coach interior sides and end components
  - deafening insulation
  - side sheeting
  - sidewall coverings
  - inside window frames
  - luggage racks
  - fixture supports
  - end sheeting
  - end wall coverings
  - end doors
  - door tracks and seals
  - partitions
  - windows and seals
  - service lockers
  - doors and hardware
  - grills
- troubleshooting procedures
- replacement procedures
- repair procedures
  - welding
  - riveting
  - fitting
  - grinding
  - cutting
  - painting
- hand tools and power equipment
  - welding equipment
  - painting equipment
  - cutting torch
  - pneumatic or electric tools
- hoisting and rigging equipment
- checking and inspection devices
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation

61.7 Describe procedures for maintaining rail coach ceilings and floors. **(3 hrs)**

Describe procedures for maintaining rail coach ceilings and floors:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- coach interior sides and end components
  - floor coverings
  - fixture supports
  - carpet
  - feature strip
  - baseboards
  - access hatches and covers
  - inserts
  - deafening and insulation
  - coverings
  - frames
  - filter frames
  - bulkheads
  - grills
- troubleshooting procedures
- replacement procedures
- repair procedures
- hand tools and power equipment
  - hand tools
  - pneumatic or electric tools
  - upholstery maintenance equipment
- verification process
- recommendation for further actions
- site clean-up procedures
- work documentation

61.8 Describe procedures for maintaining window blinds and curtains on a rail coach. **(3 hrs)**

Describe procedures for maintaining rail coach window blinds and curtains:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- coach window blinds and curtains components
  - fabrics
  - rollers
  - guides
  - tension devices
  - valances
  - rods
  - brackets
  - tie backs
  - hardware
- troubleshooting procedures
- replacement procedures
- repair procedures
- hand tools
- electric power tools
- verification process
- recommendations for further action
- site clean-up procedures
- work documentation

61.9 Describe procedures for maintaining the interior furnishing of a rail coach. **(3 hrs)**

Describe procedures for maintaining the interior furnishing of rail coach:

- safety legislation
- AAR regulations
- job documentation
- protective clothing
- protective equipment and gear
- inspection procedures
- coach interior furnishing components
  - tables
  - seats
  - benches
  - cupboards
  - counters
  - beds
  - platforms
  - drawers
  - hardware
  - brackets
  - shelving
- troubleshooting procedures
- replacement procedures
- repair procedures
- hand tools
- electric power tools
- verification process
- recommendations for further actions
- site clean-up procedures
- work documentation